Technical Documentation

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VISY-X

VISY-Density (LPG)

(en)



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1 Introduction

The VISY-Density module is an extension of the level sensors VISY-Stick Advanced and VISY-Stick Flex for measuring the product/sump density or as VISY-Density LPG in combination with the level sensor VISY-Stick Advanced LPG for measuring the product density of liquefied petroleum gas (LPG).

The VISY-X system (**V**olumen **I**nformation **SY**stem) provides highly precise and continuous level measurements for all commercially available fuels or LPG in up to 16 tanks. Simultaneously, the product temperature and water level can be measured.

The VISY-X system comprises:

- VISY-Command (central unit)
- VISY-Setup (software for configuring the VISY-Command)
- VISY-Stick (level sensors) as well as other environmental sensors

The level sensors VISY-Stick Advanced can be installed in fuel tanks in two different ways: via a screw-in unit with external thread or via the pipe installation (riser).

The level sensors VISY-Stick Advanced LPG and VISY-Stick Flex can only be mounted with a screw-in unit.

The level sensors have to be connected with the VISY-Command evaluation unit installed inside the petrol station building. VISY-Command collects the data from the level sensors and transmits it to a higher-level system (e.g. POS) upon request.

1.1 In this manual …

… you will be guided through installation, retrofitting and commissioning of the VISY-Density (LPG) module.

Please also observe the additional instructions in following manuals:

Technical documentation VISY-Command VI-4, art. no. 207184

Technical Documentation VISY-Stick and VISY-Reed, art. no. 207194

1.2 Safety Instructions

The VISY-X system is optimised for use in petrol stations and can be used for all commercially available fuels and liquefied petroleum gas. It serves to measure and evaluate the filling levels in tanks. Use the system exclusively for this purpose. Observe and follow all product safety instructions and operating instructions. The manufacturer accepts no liability for any form of damage resulting from improper use.

The level and environmental sensors have been developed, manufactured and tested in accordance with the latest good engineering practices and generally accepted safety standards. Nevertheless, hazards may arise from their use.

The safety instructions in this guide are marked as follows:



Not observing these safety instructions result in the risk of accident or damages to the system.



Useful information in this guide you should observe, appear in italics and are identified by this symbol.

The following safety precautions must be observed to reduce risk of injury, electric shocks, fire or damage to the equipment:



Only use original parts. These comply with the technical requirements specified by the manufacturer.



Installation and maintenance of the VISY-X system and its components may only be carried out by trained service technicians.



Do not change or modify the system or add any equipment without the prior consent of the manufacturer.



For the installation and maintenance of the level sensors, the requirements of the Industrial Health and Safety Regulations and the Equipment Safety Regulations as well as generally accepted rules of engineering and these instructions must be observed.



This also applies to any local safety and accident prevention regulations which are not stated in this guide.



All installation and maintenance work, with the exception of functional testing, must be carried out with the power disconnected.

2 VISY-Density and VISY-Density LPG

The VISY-Density module is available for use in fuel tanks as "VISY-Density" and for use in LPG tanks as "VISY-Density LPG".

2.1 Design and construction

VISY-Density and VISY-Density LPG differ in the module length and the measuring range (see chapter "Technical Data"):

	VISY-Density	VISY-Density LPG
Measuring range [g/l]	710 ... 900	440 ... 660
Dimensions (D x H) [mm]	Ø 50 x 138.6	Ø 50 x 138.6

Depending on the position of the VISY-Density module on the probe tube, either the product density or the sump density is determined, see Figure 1.

With the VISY-Density LPG module, only the product density of liquid gas is determined. It should be fixed at the lower end of the probe tube.

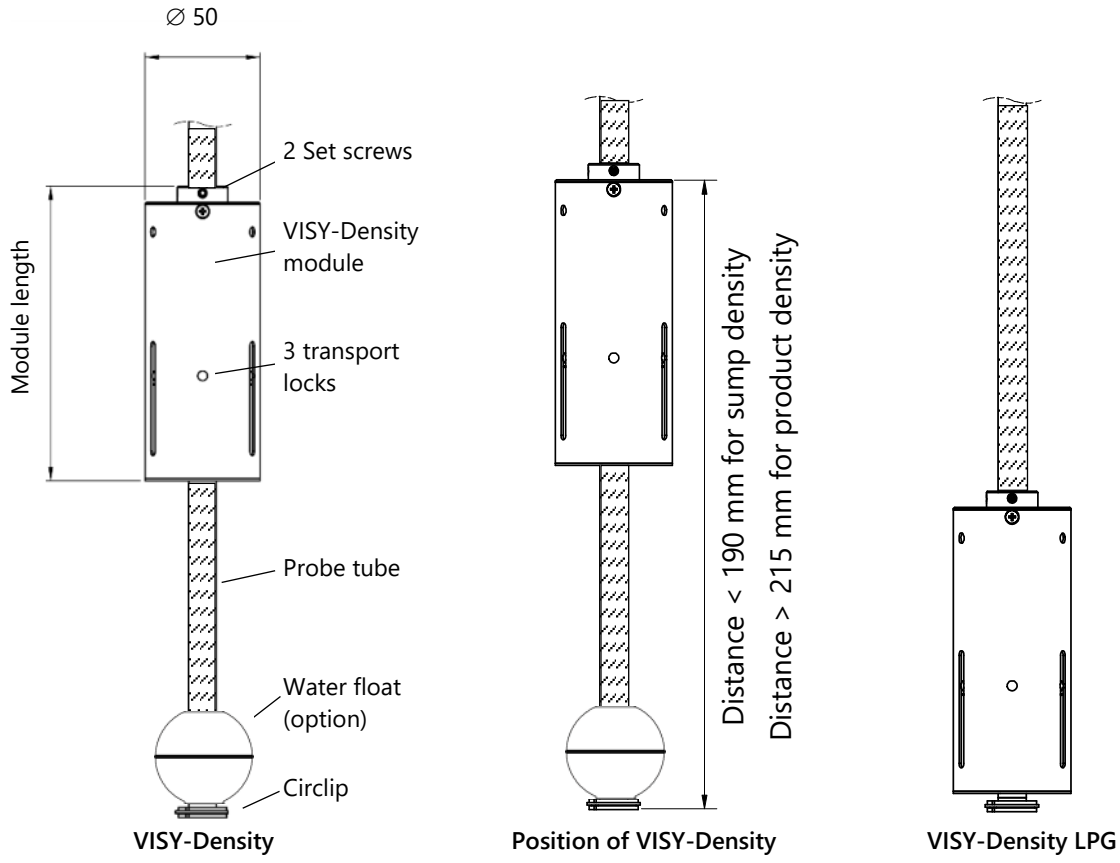


Figure 1: VISY-Density and VISY-Density LPG

3 Installation

All installation and maintenance work, with the exception of functional testing, must be carried out with the power disconnected.

The VISY-Density (LPG) module is factory calibrated to an associated VISY-Stick level sensor. If the module is retrofitted, the calibration data of the level sensor must be updated, see chapter "4. Retrofitting ...".

To operate the VISY-Density (LPG) module, an interface VI-4 with firmware 4.06 or higher is required in the VISY-Command. The firmware version is displayed after the reset button of the VI-4 is pressed. The first 3 numbers appearing one after the other (e.g. 4 ⇨ 0 ⇨ 6) on the 7-segment display show the version. If the firmware is below 4.06, please contact our technical support.

After installation of the level sensor, the VISY-Command central unit must be configured with the VISY-Setup software application.

3.1 Scope of Delivery

VISY-Stick Advanced (LPG) and VISY-Density (LPG) with optional floats are delivered in separate boxes. The VISY-Density (LPG) module must be mounted on the probe tube of the level sensor on site.



Module and probe are clearly numbered for the appropriate assignment, e.g Probe 1 belongs to Module 1, etc.

In case of retrofitting, only the VISY-Density (LPG) module with mounting accessories will be sent (see chapter 4.1).

Figure 2: Separate packaging of level sensor and VISY-Density (LPG)

3.2 Mounting

During the assembly, it is important to make sure that the probe tube is not bent. Protect the floats from knocks at all times. Humidity must not enter the M12 connector.

The VISY-Density (LPG) module must be mounted on the probe tube on site.

3.2.1 VISY-Density (LPG) with level sensor VISY-Stick Advanced (LPG)

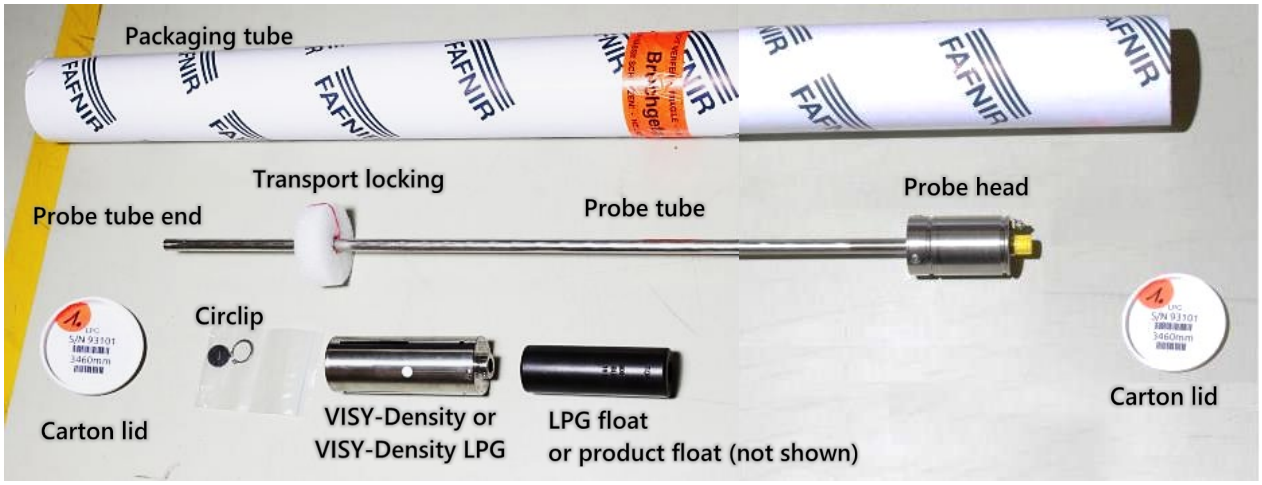


Figure 3: Packaging contents

1st Pull the VISY-Stick Advanced (LPG) probe out of the packaging tube
2nd Remove transport locks and rubber bands
3rd Slide the LPG or product float with the TOP marking in the direction of the probe head onto the probe tube
4th Slide the additional spacer for the product float onto the probe tube (not with LPG float)
5th Slide the VISY-Density module (LPG) with the designation in direction of the probe head onto the probe tube
6th Slide the water float (option) with the marking "TOP" in the direction of the probe head onto the probe tube
7th Attach the circlip and the plastic safety ring with a circlip pliers at the end of the probe tube
8th Fix VISY-Density (LPG) with the 2 setscrews at the appropriate height of the probe tube depending on the application (see Figure 1):
8th a) To measure the sump density: Distance between the probe tube end and the upper edge of the VISY-Density module less than 190 mm
8th b) To measure the product density: Distance between the probe tube end and the upper edge of the VISY-Density module more than 215 mm
8th c) For VISY-Density LPG: mount the module at the lower end of the probe tube

9th Remove the transport lock (3 plastic plugs inserted on the side) from the VISY-Density (LPG) Module

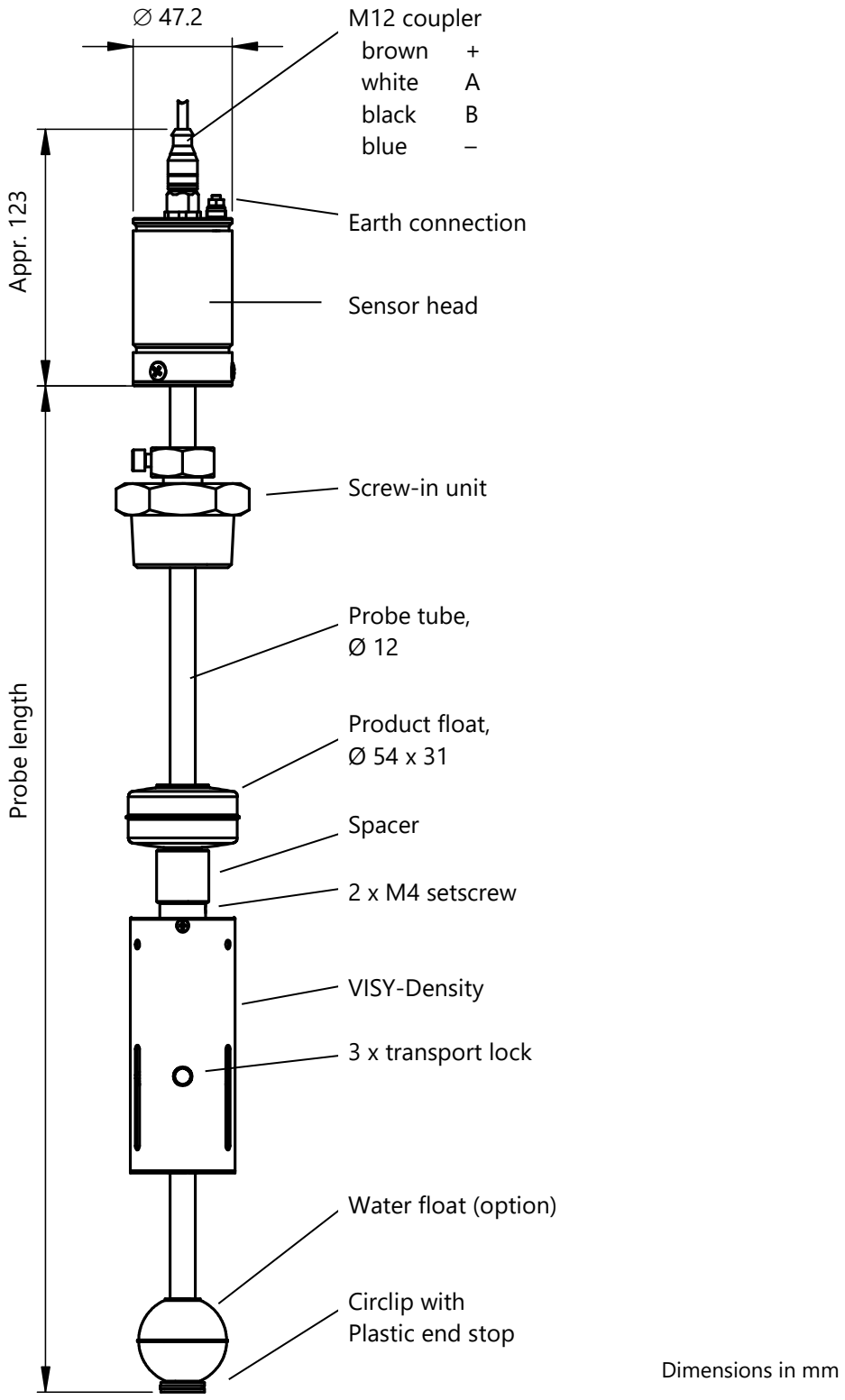


Figure 4: VISY-Stick Advanced with water float and VISY-Density module

3.2.2 VISY-Density with level sensor VISY-Stick Flex

VISY-Stick Flex must not be bent during assembly apart from the straightening when installing it in the tank. Protect the floats from knocks at all times. Humidity must not enter the M12 connector.



1st Lift the VISY-Stick Flex probe out of the box
2nd Remove transport locks and rubber bands
3rd Use an Allen key to loosen the weight from the probe tube end and remove it
4th If installed, remove the water float from the probe tube
5th Slide the VISY-Density module with the designation in direction of the probe head onto the probe tube
6th Slide the water float (option) with the marking "TOP" in the direction of the probe head onto the probe tube
7th Slide the weight onto the probe tube
8th Using an Allen key, turn the setscrews of the weight into the groove of the probe tube until the stop is reached.
9th Fix VISY-Density with the 2 setscrews at the appropriate height of the probe tube depending on the application (see Figure 1):
9th a) To measure the sump density: Distance between the probe tube end and the upper edge of the VISY-Density module less than 190 mm
9th b) To measure the product density: Distance between the probe tube end and the upper edge of the VISY-Density module more than 215 mm

The VISY-Density module must not be fixed to the corrugated hose of the VISY-Stick Flex probe.

10th Remove the transport lock (3 plastic plugs inserted on the side) from the VISY-Density module

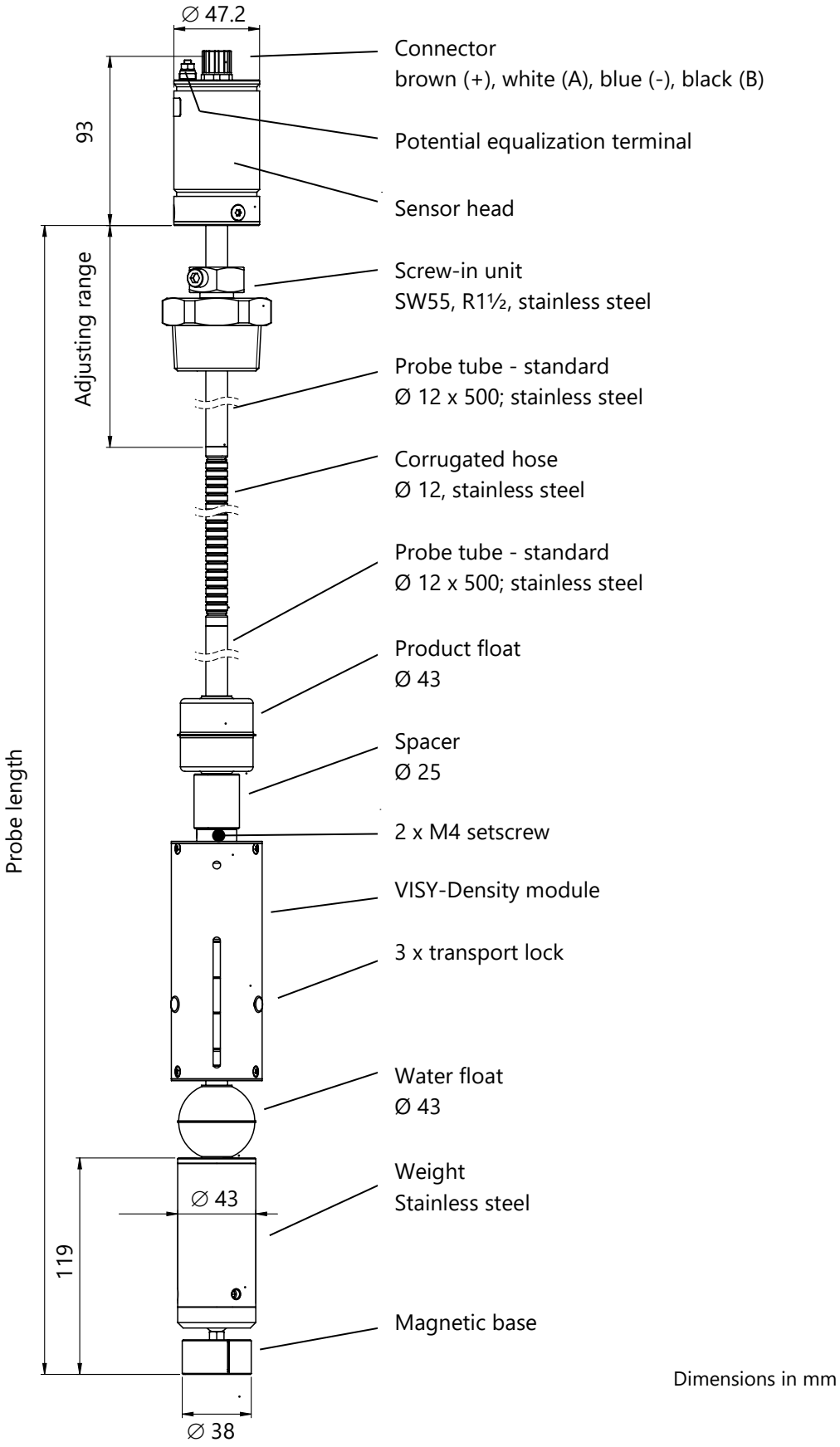


Figure 5: VISY-Stick Flex with VISY-Density Module

3.3 Installing the level sensors

The level sensors may only be installed with the power disconnected.

The level sensor must be connected to the M12 connector and the equipotential bonding cable before installation in the tank.

Before installation, move the floats down on the probe tube as far as possible to prevent damaging the floats by falling down when erecting the probe.

The transport lock of the VISY-Density (LPG) module (3 plastic plugs inserted on the side) must be removed before installation.

For installation in LPG tanks all corresponding safety precautions must be observed. The LPG tank must be properly emptied before installing the VISY-Density LPG module.

At least 2 people are required to install/remove the VISY-Stick Flex level sensor.

For instructions on installing/removing the VISY-Stick level sensor, see also the technical documentation:

VISY-Stick VISY-Reed, art no. 207194

4 Retrofitting the VISY-Density (LPG) module

An existing VISY-Stick Advanced or VISY-Stick Flex level sensor can be subsequently supplemented with a VISY-Density module; an existing VISY-Stick Advanced LPG level sensor can be subsequently supplemented with a VISY-Density LPG module. The level sensor must be updated on-site with the calibration data of the VISY-Density (LPG) module with the aid of a PC/laptop.

☞ *The VISY-Density (LPG) module can only be operated with VISY-Stick Advanced probes from device number 40000.*

☞ *The VISY-Density module can only be operated with the current VISY-Stick Flex probes or with a firmware update. Please contact our technical support.*

☞ *To update the calibration data or the firmware, the FAFNIR USB adapter (Art. No. 900040) is required, see chapter 4.5.*

☞ *To operate the VISY-Density (LPG) module, an interface VI-4 with firmware 4.06 or higher is required in the VISY-Command. The firmware version is displayed after the reset button of the VI-4 is pressed. The first 3 numbers appearing one after the other (e.g. 4 ⇨ 0 ⇨ 6) on the 7-segment display show the version. If the firmware is below 4.06, please contact our technical support.*

⚠ *During the assembly, it is important to make sure that the probe tube is not bent. Protect the floats from knocks at all times. Humidity must not enter the M12 connector.*

☞ *A VISY-Stick Advanced water float must be replaced with a standard water float (without spacer collar) to retrofit the VISY-Density module. The standard water float must be ordered separately.*

4.1 Included parts of the VISY-Density (LPG) extension set

With the VISY-Density (LPG) extension set you will receive the following components:

- VISY-Density or VISY-Density LPG
- Circlip and plastic end stop
- Spacer for product float
- Calibration data

4.2 Prerequisites

- VISY-Density configuration software
- Circlip pliers
- Hexagon (Allen) key for M4 setscrew (2 mm)

4.3 Removing the level sensors

All installation and maintenance work, with the exception of functional testing, must be carried out with the power disconnected.

For installation in LPG tanks all corresponding safety precautions must be observed. The LPG tank must be properly emptied before removing or installing a level sensor.

At least 2 people are required to install/remove the VISY-Stick Flex level sensor.

For instructions on installing/removing the VISY-Stick level sensor, see also the technical documentation:

VISY-Stick VISY-Reed, art no. 207194

1st Disconnect the power supply of the VISY-Command

2nd Write down the sensor number and tank number (assignment for the installation)

3rd If available, unscrew the screw-in unit from the thread of the tank without loosening the probe tube from the screw-in unit; otherwise a new probe adjustment will be necessary.

4th Carefully pull the level sensor at probe head out of the tank or the tank riser and …

4th a) VISY-Stick Advanced (LPG): … Place it on a clean surface

4th b) VISY-Stick Flex: … carefully roll it up and place it on a clean surface

5th The equipotential bonding cable and M12 connector can be removed from the probe head for retrofitting the VISY-Density (LPG) module.

6th Loosen and remove from the end of the probe tube …

6th a) VISY-Stick Advanced (LPG): … the circlip and plastic end stop using the circlip pliers

6th b) VISY-Stick Flex: … the weight using an Allen key

7th If installed, remove the water float from the probe tube

4.4 Mounting the VISY-Density (LPG) module

1st Slide the spacer for the product float (not with LPG) onto the probe tube

2nd Slide the VISY-Density (LPG) with the designation in direction of the probe head onto the probe tube

3rd If available, slide the standard water float without distance collar (to be ordered separately) onto the probe tube with the TOP marking pointing towards the probe head (see Figure 4)

4th Attach the circlip and the plastic safety ring with a circlip pliers at the end of the probe tube

5th Fix VISY-Density (LPG) with the 2 setscrews at the appropriate height of the probe tube depending on the application (see Figure 1):

5th a) To measure the sump density: Distance between the probe tube end and the upper edge of the VISY-Density module less than 190 mm

5th b) To measure the product density: Distance between the probe tube end and the upper edge of the VISY-Density module more than 215 mm

5th c) For VISY-Density LPG: mount the module at the lower end of the probe tube



On the VISY-Stick Flex, the VISY-Density module must not be fixed to the corrugated hose.

6th Remove the transport lock (3 plastic plugs inserted on the side) from the VISY-Density (LPG) module

4.5 Configuring the level sensor with VISY-Density (LPG) calibration data

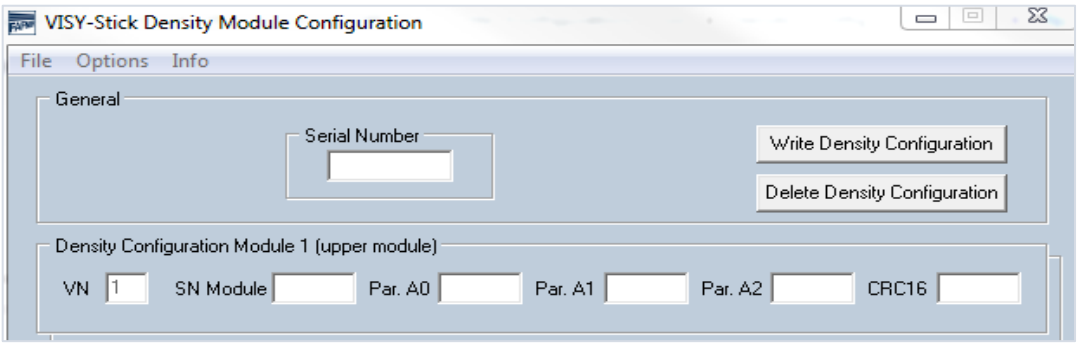


The level sensor must not be programmed when installed or in explosive area.

1st Installation of the FAFNIR USB adapter (automatic installation):
Plug the FAFNIR USB adapter into a free USB port on the PC (the PC must have Internet connection to install the drivers).
The necessary drivers are installed automatically by Windows.

2nd Plug the M12 connector of the FAFNIR USB adapter in the probe head

3rd Install and start the VISY-Density configuration software on the PC / laptop



4th Entering the calibration data in the configuration program:

- **Serial number** : is automatically read by the configuration program
- **VN**: … Default value
- **SN Module**: … (See calibration data)
- **Par. A0**: … (See calibration data)
- **Par. A1**: … (See calibration data)
- **Par. A2**: … (See calibration data)
- **CRC16:** … (See calibration data)

The calibration data of the VISY-Density (LPG) module is included in the scope of delivery.

5th Press the button "Write Density Configuration" to save the values

6th Remove M12 connector of the the FAFNIR USB adapter from the probe head

7th Plug the M12 connector of the VISY-Command in the probe head

8th Connect the power supply of the VISY-Command

9th Setting the level alarm in VISY-Command:

- Connect the VISY-Command with the PC / laptop and start the VISY-Setup software application
- Move the product float on the probe tube directly to the VISY-Density (LPG) module
- In the VISY-Setup menu "current measured values -> product height in mm", read out the product height (corresponds to the product float position)
- Set the low alarm threshold to a value slightly higher than this product height

4.6 Installing the level sensors

The level sensors may only be installed with the power disconnected.

The level sensor must be connected to the M12 connector and the equipotential bonding cable before installation in the tank.

Before installation, move the floats down on the probe tube as far as possible to prevent damaging the floats by falling down when erecting the probe.

The transport lock of the VISY-Density (LPG) module (3 plastic plugs inserted on the side) must be removed before installation.

For installation in LPG tanks all corresponding safety precautions must be observed. The LPG tank must be properly emptied before installing the VISY-Density LPG module.

At least 2 people are required to install/remove the VISY-Stick Flex level sensor.

For instructions on installing/removing the VISY-Stick level sensor, see also the technical documentation:

VISY-Stick VISY-Reed, art no. 207194

5 Maintenance

5.1 Servicing

The level sensors and associated floats are maintenance-free if they are operated according to the manufacturer's specifications and not used to measure other media.

5.2 Return Shipment

Before returning any FAFNIR equipment, the Return Material Authorization (RMA) from FAFNIR customer service is required. Please contact your account manager or the customer service to receive the instructions on how to return goods.

☞ *The return of FAFNIR products is only possible after approval by the FAFNIR customer service.*

6 Technical Data

	VISY-Density	**VISY-Density LPG**
Measuring range [g / l]	710 ... 900	440 ... 660
Accuracy (VISY-Stick Advanced) [g/l]	≤ 1.0	
Accuracy (VISY-Stick Flex) [g/l]	2.0	
Resolution (VISY-Stick Advanced) [g/l]	0.1	
Temperature range [°C]	-40 ... +85	
Dimensions (diameter x height) [mm]	Ø 50 x 138.6	
Operating pressure [bar]	3.0	≤ 16
Material	Stainless steel	

6.1 Technical information

- For details on explosion protection, permissible ambient temperature (probe head), and the connection data please refer to the approvals and operating instructions.
- With a battery-powered radio transmitter, all level sensors can be used as wireless versions.
- All level sensors have protection class IP68 according to EN 60529 (IPX8: Immersion depth of 2 metres for 30 days).

For a detailed list of technical data see Technical Documentation:

📖 VISY-Stick VISY-Reed Data, multilingual, art. no. 350105

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